

CLAIMS

What is claimed is:

1. A system for locating a golf ball, the system comprising:

the golf ball having an encapsulated transmitter that modulates an audible signal to an output band, wherein the output band defines an output bandwidth; and

a receiver having an input band defining an input bandwidth wherein a center frequency of the input band of the receiver is variable;

wherein the input bandwidth is smaller than the output bandwidth.
2. The system of claim 1, wherein the audible signal comprises a saw-tooth wave.
3. The system of claim 1, wherein the audible signal has a period defining a frequency between about 20 Hz and about 20 kHz.
4. The system of claim 1, wherein the audible signal has a period defining a frequency between about 60 Hz and about 2 kHz.
5. The system of claim 1, wherein the audible signal has a period defining a frequency between about 2 kHz and about 6 kHz.
6. The system of claim 1, wherein the audible signal comprises a sequence of audible tones.
7. The system of claim 1, wherein the audible signal comprises a sequence of audible tones and pauses between the tones.
8. The system of claim 1, wherein the transmitter further includes a battery and the audible signal indicates a condition of the battery.
9. The system of claim 1, wherein the transmitter includes a free running oscillator.
10. The system of claim 9, wherein the free running oscillator includes an LC tank circuit having an inductor and a capacitor.

11. The system of claim 10, wherein the inductor comprises an antenna.
12. The system of claim 1, wherein the transmitter further includes a variable capacitance.
13. The system of claim 12, wherein the variable capacitance is provided by a bank of switched capacitors.
14. The system of claim 13, wherein the bank of switched capacitors is controlled by an output of a counter.
15. The system of claim 1, wherein the center frequency of the input band cycles across a range of the output band at a sub-audible rate.
16. The system of claim 15, wherein the sub-audible rate is between about 0 Hz and about 10 Hz.
17. The system of claim 15, wherein the sub-audible rate is between about 1 Hz and about 2 Hz.
18. The system of claim 15, wherein the input band cycles across the output band following a saw-tooth wave having a period defined by the sub-audible rate.
19. The system of claim 15, wherein the input band cycles across only a sub-portion of the output band thereby defining a guard band at each end of the output band.
20. The system of claim 19, wherein the guard band is at least as wide as the input bandwidth.
21. The system of claim 1, wherein an output bandwidth of the output band is between about 4 MHz and about 5 MHz.
22. The system of claim 1, wherein the input bandwidth is between about 0.1 MHz and about 0.3 MHz.
23. The system of claim 1, wherein an output bandwidth of the output band is between about 4 MHz and about 5 MHz and the input bandwidth is between about 0.1 MHz and about 0.3 MHz.

24. The system of claim 1, wherein the input bandwidth represents less than 50 % of an output bandwidth of the output band.
25. The system of claim 1, wherein the input bandwidth represents between about 5 % and about 50 % of an output bandwidth of the output band.
26. The system of claim 1, wherein the input bandwidth represents between about 2 % and about 8 % of an output bandwidth of the output band.
27. The system of claim 1, wherein the receiver includes a detector.
28. The system of claim 27, wherein the detector comprises an AM detector.
29. The system of claim 1, wherein the receiver includes an extendable antenna.
30. A golf ball comprising:
an encapsulated transmitter that modulates an audible signal to an output band;
wherein the output band defines an output bandwidth and the transmitter includes a free running oscillator having an inductor and a capacitor.
31. The golf ball claim 30, wherein the free running oscillator further has a variable capacitance.
32. The golf ball claim 31, wherein the variable capacitance is provided by a bank of switched capacitors.
33. The golf ball claim 32, wherein the bank of switched capacitors is controlled by an output of a counter.
34. A method to locate a golf ball using a golf ball location system having a transmitter encapsulated in a golf ball and a receiver, the method comprising:
modulating an audible signal with the transmitter;
transmitting the modulated signal to an output band;

providing a receiver with an input band, wherein the input band is narrower and within the output band;

receiving an input signal residing within the input band; and

varying a center frequency of the input band to traverse the output band.

35. The method of claim 34, wherein the act of varying the center frequency comprises modulating the input band across the output band at a sub-audible rate.

36. The method of claim 34, further comprising:

extending an antenna on the receiver to increase an input signal gain;

moving the receiver closer to the transmitter; and

retracting the antenna to decrease the input signal gain.

37. The method of claim 34, wherein the act of modulating the audible signal comprises cycling a center frequency of the transmitted signal across the output band at the audible rate.